What is claimed is:

1. A method of forming a fluid interface port in a microfluidic system, comprising:

forming at least a portion of a microchannel in a substrate, and

forming a fluid interface port along a length of the channel having suitable dimensions to form a virtual wall therein when the microchannel is filled with a liquid.

2. The method of claim 1, wherein the step of forming the microchannel comprises the steps of

forming a partially open channel having an open top portion, and

covering the partially open channel to form the microchannel.

3. The method of claim 2, further comprising the step of providing a cover to cover the partially open channel.

4. The method of claim 3, wherein the fluid interface port is formed in the cover.

5. The method of claim 2, further comprising the step of stacking a cover for covering the partially open channel and the substrate together to form a microfluidic structure having a microchannel.

6. The method of claim 1, further comprising the step of forming a second fluid interface port having suitable dimensions to form a second virtual wall.

7. The method of claim 1, further comprising the step of forming an array of fluid interface ports.

8. The method of claim 1, further comprising the step of providing a hydrophobic patch in the microchannel.

9. The method of claim 8, wherein the step of providing the hydrophobic patch comprises the step of disposing the hydrophobic path at a position in the channel that is substantially coaxial with the fluid interface port.

10. The method of claim 9, wherein the step of providing the hydrophobic patch comprises introducing a hydrophobic material through the fluid interface port.

11. The method of claim 1, further comprising the step of forming a plurality of microchannels in the substrate.

12. The method of claim 1, further comprising the step of forming a non-linear microchannel in the substrate.

13. The method of claim 1, further comprising the steps of
forming at least partially one or more microchannels in the substrate,
forming one or more reservoirs in a second substrate,
disposing the substrate in the second substrate,
disposing a cover over the substrate to form the microchannel, and
forming one or more of the fluid interface ports in the cover.

14. A microfluidic system formed according to the methods of claim 1.

15. A microfluidic structure, comprising
a substrate,
one or more microchannels formed in the substrate,
a cover for covering the microchannel, wherein said microchannel includes a side wall, and
one or more fluid interface ports formed in the cover along the length of the microchannel, wherein a virtual wall is formed in the fluid interface port when a fluid is disposed in the microchannel.

16. The structure of claim 15, wherein said cover comprises multiple layers.

17. The structure of claim 15, wherein said cover comprises a single layer.

18. The structure of claim 15, further comprising a filling aperture formed in the cover.

19. The structure of claim 15, further comprising a venting aperture formed in the cover.

20. The structure of claim 15, further comprising a hydrophobic patch disposed in the channel.

21. The structure of claim 15, further comprising a stopper aperture formed in the cover.

22. The structure of claim 15, wherein the fluid interface port is selected from the group consisting of a stopper aperture, a filling aperture, and a venting aperture.

23. The structure of claim 22, further comprising an encapsulant for sealing the filling aperture.

24. The structure of claim 22, further comprising a cover for covering and sealing the filling aperture.

25. The structure of claim 15, further comprising a covering layer disposed in the fluid interface port.

26. The structure of claim 15, wherein the covering layer is immiscible with a fluid disposed in the microchannel.

27. The structure of claim 15, wherein the covering layer prevents evaporation of a liquid disposed in the microchannel through the fluid interface port.

28. The structure of claim 15, wherein the covering layer prevents evaporation of a liquid disposed in the microchannel through the fluid interface port, while allowing injection of a second fluid into the microchannel through the covering layer.

29. The structure of claim 15, further comprising a material disposed on a wall of the port for interacting with a fluid in the microchannel.

30. The structure of claim 15, further comprising a plurality of fluid interface ports.

31. The structure of claim 30, wherein at least two of said plurality of fluid interface ports are disposed relative to another to extend across a diameter of the microchannel.

32. The structure of claim 30, wherein at least two of said plurality of fluid interface ports are disposed relative to another to extend axially along a length of the microchannel.

33. The structure of claim 15, wherein the microchannel is non-linear.

34. The structure of claim 15, wherein the microchannel is U-shaped.

35. The structure of claim 15, further comprising one or more reactors coupled to the microchannel for effecting a chemical reaction in the microchannel.

36. The structure of claim 15, further comprising a liquid injection system for injecting a fluid into the microchannel.

37. The structure of claim 15, further comprising a liquid ejection system for ejecting a liquid from the microchannel.

38. The structure of claim 15, further comprising a heater disposed in the microchannel.

39. The structure of claim 15, further comprising a gas pressurizer coupled to the structure.

40. The structure of claim 15, further comprising a pressure pulse generator for applying a pressure pulse to a fluid when disposed in the microchannel to eject a droplet of the fluid from the fluid interface port.

41. The structure of claim 40, wherein the pressure pulse generator comprises a second virtual wall disposed coaxially with the virtual wall, and a gas pressurizer in communication with the second virtual wall.

42. A method of rendering an interior surface of a microchannel hydrophobic, comprising:

providing a microchannel having an interior bounded by a side wall and a fluid interface port comprising an aperture formed in the side wall to provide access to the interior of the microchannel; and

introducing a hydrophobic material to the interior through the aperture, such that the hydrophobic material forms a hydrophobic patch on an interior surface of the side wall that is coaxially aligned with the aperture.

43. A method of manufacturing a microfluidic chip, comprising:

providing a first planar sheet having a recess formed in a top surface therein,

applying a middle layer to the first planar sheet,

removing a portion of the middle layer to define a channel and a fluid interface port in communication with the recess, wherein the fluid interface port is sized and dimensioned such that when a fluid is disposed in the recess and channel, the fluid forms a virtual wall at the fluid interface port,

applying a second planar sheet to the first planar sheet, and

removing a portion of the second planar sheet to define an access hole in communication with the fluid interface port.

44. The method of claim 43, wherein the first planar sheet and the second planar sheet comprise glass plates.

45. The method of claim 43, wherein the middle layer comprises a photo patternable material.

46. The method of claim 45, further comprising the step of forming a second fluid interface port in the first planar sheet to provide access to the interior of one of the channel and the recess, wherein the second fluid interface port is sized and dimensioned such that when a fluid is disposed in the recess and channel, the fluid forms a virtual wall at the second fluid interface port.

47. The method of claim 46, wherein the second fluid interface port is coaxially arranged with the first fluid interface port.